0054253

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

01-ERD-017

NOV 3 0 2000

Ms. Jane A. Hedges
Cleanup Section Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336-6018

Dear Ms. Hedges:

TRANSMITTAL OF CONTAINED-IN DETERMINATION REQUEST FOR LISTED WASTE METHANOL (F003) AT THE 100-NR-2 OPERABLE UNIT (OU)

The U.S. Department of Energy, Richland Operations Office (RL) is requesting that the State of Washington Department of Ecology grant a contained-in determination for methanol in groundwater at the 100-NR-2 OU. Methanol is reported in the Resource Conservation and Recovery Act form 3 of the Part A Permit for the 116-N-1 and 116-N-3 sites. The groundwater under these sites is currently undergoing remediation in accordance with the 100-NR-2 Interim Remedial Action Record of Decision and the Closure Plan.

The contained-in determination request is enclosed and includes general background information about methanol, a history of the use of methanol at the two waste sites, and the field and analytical sampling approach. Upon approval of this request, RL will remove the F003 listed waste code from the existing waste and will not include the code in future 100-NR-2 groundwater OU waste designation.

If you have any questions regarding this request, please contact me at (509) 373-9631.

Sincerely,

Arlene C. Tortoso

Arlene C. Tortoso, Project Manager
Environmental Restoration Division

ERD:ACT

Attachment

cc w/attach:
J. V. Borghese, CHI
J. Yokel, Ecology
M. K. Harmon, EM-43
D. R. Sherwood, EPA
Admin. Record, H6-08 (100-NR-2)

cc w/o attach:
J. F. Armatrout, BHI
J. G. Woolard, BHI
J. Price, Ecology

CONTAINED-IN DETERMINATION REQUEST FOR LISTED WASTE METHANOL (F003) AT 100-NR-2 OPERABLE UNIT

1.0 INTRODUCTION

The U.S. Department of Energy, Richland Operations Office (RL) is requesting that the Washington State Department of Ecology (Ecology) grant a contained-in determination for groundwater from the 100-NR-2 Operable Unit (OU). The groundwater may have received methanol (F003), which is a *Resource Conservation and Recovery Act* (RCRA)-listed waste, from past discharges to the 116-N-1 and 116-N-3 sites. Methanol is regulated as "F003" waste because of its characteristic of ignitability.

Under Federal regulations, the "F003" designation is applied solely on the characteristic of ignitability. Under 40 *Code of Federal Regulations* (CFR) 261.3(a)(2)(iii), a waste listed solely due to a hazardous waste characteristic is no longer listed when the waste mixture no longer exhibits the characteristic. The methanol, upon mixing with water after discharge, would no longer be ignitable and, hence, does not carry the Federal "F003" code. Therefore, methanol in 100-NR-2 OU groundwater is designated as a "federally exempt" listed waste code. Unlike the Federal regulations, *Washington Administrative Code* (WAC) 173-303 does not allow for the removal of listed waste codes in situations where the listing is based solely on characteristics and a waste mixture does not exhibit the characteristic. As a consequence, the listed waste code remains.

The purpose of this request is to eliminate the "F003" listing from the groundwater and other materials that come into contact with groundwater (e.g., resins from 100-NR-2 OU pump-and-treat system, wipes, and gloves), consequently eliminating the need for special handling requirements, including transportation, waste management, or any other restrictions associated with a hazardous waste. In Washington State, contaminated media (e.g., groundwater) may be determined to no longer contain the dangerous waste code (i.e., the "listing") if the contaminated media fall below specific risk-based concentrations. As a general policy, Ecology has established these risk-based action levels as the residential standards calculated under the *Model Toxics Control Act* (MTCA) (WAC 173-340-720) groundwater cleanup standards.

2.0 BACKGROUND

Methanol is one of the dangerous wastes reported in the RCRA dangerous waste permit application for the 116-N-1 and 116-N-3 waste sites. Methanol was used at the 100-N Area laboratories and may have been disposed in the floor drains that discharged to the waste sites. During the years of operation until shortly after reactor shutdown (1964 through 1991), large volumes of reactor coolant wastewater, as well as small quantities of corrosive liquids and laboratory chemicals generated by various N Reactor operations, were discharged to the soil through the 116-N-1 and 116-N-3 sites. The *100-NR-1 Treatment, Storage, and Disposal Units Corrective Measures Study/Closure Plan* (DOE-RL 1998) provides a chronology of the liquid waste discharged to the soil. These wastewaters infiltrated the vadose zone soil and contaminated the groundwater. Figure 1 shows the location of the 116-N-1 and 116-N-3 sites and the associated groundwater plume.

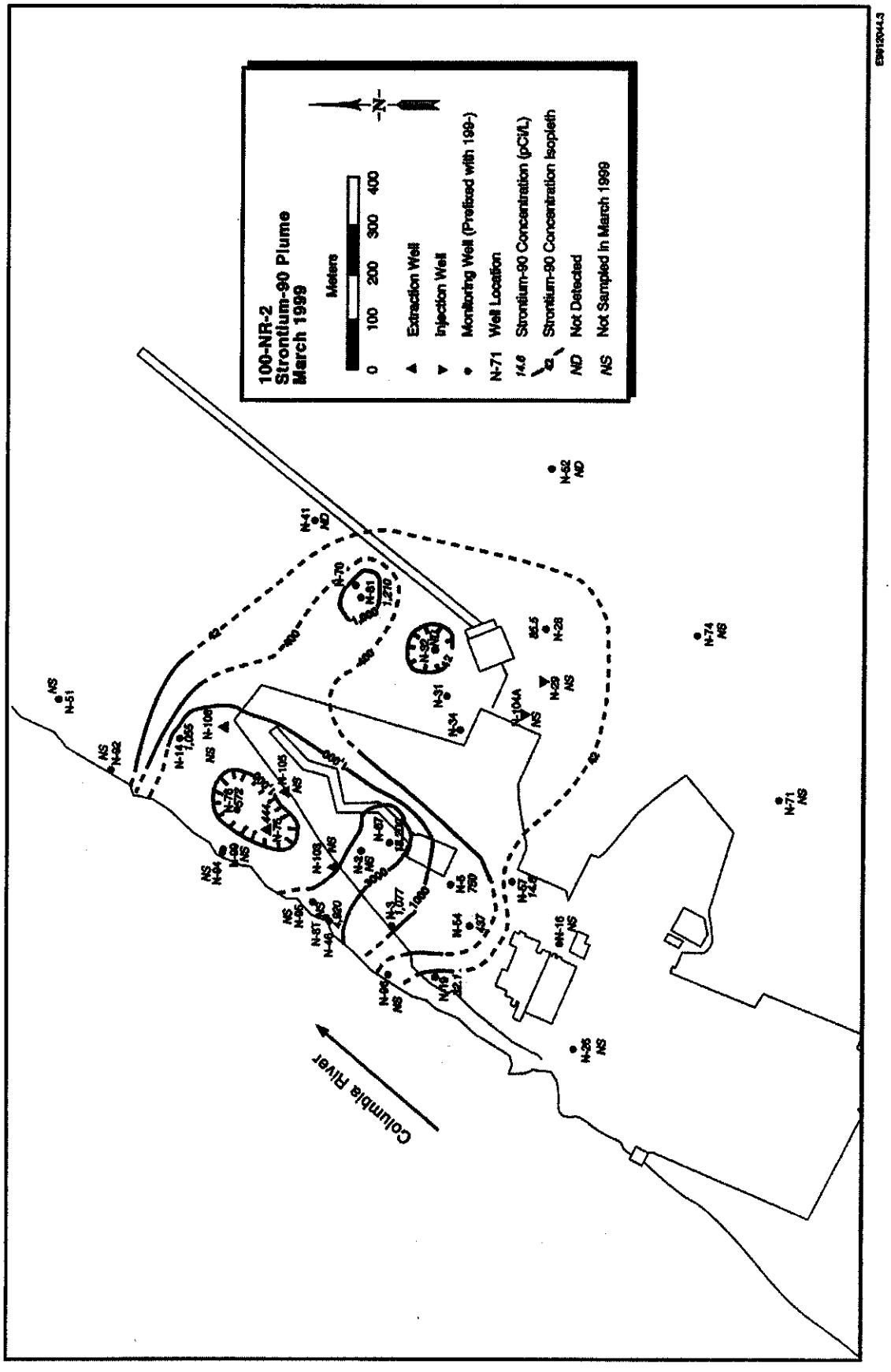

Figure 1. 100-NR-2 Strontium-90 Plume, March 1999.

Methanol that was used in the laboratory and disposed through drains would have been significantly diluted with large amounts of water, so the ultimate concentration of methanol in water entering the 116-N-1 and 116-N-3 waste sites would have been very low. The liquid discharge rate to the treatment, storage, and disposal (TSD) units was 4,320,000 gal/day (1.315E+10 lb/yr) and the maximum methanol discharge was 6,200 lb/yr. This equates to 0.47 parts per million (ppm) of methanol being discharged to the TSD units. Because methanol is a liquid that does not bind well to the soil, methanol that makes its way into the ground can move through the ground and enter the groundwater. Methanol dissolves completely when mixed with water.

2.1 CONTAMINANTS OF CONCERN

In addition to methanol, other dangerous wastes were discharged to the 116-N-1 and 116-N-3 waste sites, as identified in Form 3 of the Part A dangerous waste permit application for these waste sites. In order to achieve a contained-in determination, it must be demonstrated that the media do not contain dangerous wastes above toxicity characteristic designation levels. Over the past 5 years, the pH level in the groundwater has measured between 5.26 and 9.17 and, therefore, does not exhibit the characteristic of corrosivity. Table 1 presents the toxicity characteristic constituents identified in Form 3 and the reported values in the groundwater at the 100-NR-2 OU. Data from this table were collected from the Hanford Environmental Information System database. As this table demonstrates, none of the dangerous waste constituent concentrations exceed designation limits. Therefore, the only contaminant of concern that needs to be addressed by this contained-in determination is methanol.

Table 1. Dangerous Waste Codes.

Contaminant	Waste ID#	Estimated Annual Quantity (lbs)	Designation Level	Concentration in Groundwater
Cadmium	D006	100	1 ppm	0.103 ppm[a]
Chromium	D007	10,000	5 ppm	2.5 ppm[b]
Lead	D008	150	5 ppm	0.28 ppm[c]
Mercury	D009	6,200	0.2 ppm	3.6E-4 ppm[d]

[a] Maximum cadmium concentration reported in well 199-N-26 in 1989.
[b] Maximum total chromium concentration reported in well 199-N-57 in 1994.
[c] Maximum lead concentration reported in well 199-N-67 in 1993.
[d] Maximum mercury concentration reported in well 199-N-14 in 1994.

3.0 METHANOL CONTAINED-IN STRATEGY

The strategy used to prepare this contained-in determination request is based on existing groundwater data and supplemental data recently obtained from additional samples collected from the extraction wells at the 100-NR-2 OU pump-and-treat system. Additional data were required to confirm previous results and to obtain a detection limit below the methanol risk-

based action level of 4 ppm. The strategy for the contained-in evaluation and sampling effort was discussed with Ecology on August 22, 2000. The copy of the presentation from this meeting is included as an attachment to this request.

3.1 STATISTICAL SAMPLE SIZE DETERMINATION

The sample size formula provided in the U.S. Environmental Protections Agency's (EPA's) *Guidance for the Data Quality Objectives Process* (EPA 1994) was used to determine the number of samples for the analysis. The formula is as follows:

$$n = s^2 * (z_{1-\alpha}+z_{1-\beta})^2/(RAG-LBGR)^2 + 0.5*z_{1-\alpha}^2$$

where:

s	=	the sample standard deviation
$z_{1-\alpha}/z_{1-\beta}$	=	the values of the standard normal distribution corresponding to 1 minus the Type I and Type II error rates, respectively, of the statistical test (usually 0.05 and 0.20)
RAG	=	remedial action goal, which is the cleanup value
LBGR	=	lower bound of gray region, which is estimated as 1.4 times the sample mean.

For the methanol calculation, it was expected that no sample value would be above the detection limit of 2 ppm, which would serve as the sample mean. Therefore, the LBGR was 2.8 ppm (2 x 1.4). The RAG is 4 ppm based on the MTCA Method B value for groundwater. The sample variance, s^2, was estimated as 0.78 based on an assumed data range of 1 ppm. The values of α and β are assumed to be 0.10 and 0.20, respectively. Consequently the values of $z_{1-\alpha}$ and $z_{1-\beta}$ are 1.282 and 0.85, respectively.

Substituting these values in the above equation produces a sample size of n = 4 (rounded to the next highest integer). Therefore, four samples need to be collected.

3.2 SAMPLE LOCATIONS

Sample locations were selected to be within the plume at the 100-NR-2 OU. The basis for this selection is the assumption that if methanol is present in the groundwater, it will be co-located with strontium-90 because the source of the strontium-90 is the 116-N-1 and 116-N-3 waste sites. The samples were collected from the extraction wells because their locations cover a good cross-sectional area of the strontium-90 plume and because the wells also represent a boundary between the contaminated groundwater and the Columbia River.

3.3 SAMPLE COLLECTION AND HANDLING

Samples were collected and handling accordance with BHI-EE-01, *Environmental Investigations Procedures*, including the following procedures:

- Procedure 1.5, "Field Logbooks"
- Procedure 2.5, "Data Package Validation Process"
- Procedure 3.0, "Chain of Custody"
- Procedure 3.1, "Sample Packaging and Shipping"
- Procedure 4.1, "Groundwater Sampling"
- Procedure 4.2, "Sampling storage and Shipping Facility."

Duplicate samples were collected during June and September 2000 sampling events. As part of the June sampling event, the laboratory analyzed a blank sample and a spiked blank sample, both of which reported a nondetect value for methanol.

4.0 SAMPLING RESULTS

Table 2 provides a list of the methanol data collected from all sampling events at the 100-NR-2 OU. A laboratory qualifier of "U" is used to denote a nondetect, with the value reported being the minimum detection limit used to analyze the sample. The additional sampling round performed to support this request was performed on September 3, 2000. For the September 2000 sampling event, three extraction well samples and one quality control sample (i.e., duplicate) were analyzed. The method detection limit was 2 ppm, and all sample results were measured as nondetectable.

Table 2. Methanol Analytical Results. (2 Pages)

Collection Date	Sample Number	Well Name/ Sample location	Analytical Method	Value Reported (ppm)	Laboratory Qualifier
03/17/99	BOTXX5	199-N-3	EPA Method 8015B	0.93	U
03/17/98	BON6V2	Drum EFSG-95-02, 100-NR-2 waste designation	EPA Method 8015B	5	U
02/27/98	BON6V1	Sample port V2-2, 100-NR-2 pump-and-treat system	EPA Method 8015B	5	U
06/06/00	BOYC01	Trip blank	EPA Method 8015B	4	U
06/06/00	BOYC02	199-N-106A	EPA Method 8015B	4	U
06/06/00	BOYC03	199-N-75	EPA Method 8015B	4	U
06/06/00	BOYC04	199-N-105A	EPA Method 8015B	4	U
06/06/00	BOYC05	199-N-103A	EPA Method 8015B	4	U

Table 2. Methanol Analytical Results. (2 Pages)

Collection Date	Sample Number	Well Name/ Sample location	Analytical Method	Value Reported (ppm)	Laboratory Qualifier
06/06/00	BOYC06	199-N-103A[a]	EPA Method 8015B	4	U
09/13/00	B10797	199-N-106A	EPA Method 8015B	2	U
09/13/00	B10798	199-N-75	EPA Method 8015B	2	U
09/13/00	B10799	199-N-75[a]	EPA Method 8015B	2	U
09/13/00	B107B0	199-N-103A	EPA Method 8015B	2	U

[a] Denotes duplicate sample.

4.1 STATISTICAL SIGNIFICANCE

A total of 13 samples have been collected over the past 3 years, including the 4 samples that were collected in September 2000. Methanol results from these sampling events did not exceed the method detection limit; therefore, the statistical adequacy requirement for the data has been met.

5.0 REQUEST FOR CONTAINED-IN DETERMINATION

The MTCA Method B cleanup standard for methanol is 4 ppm in groundwater. Methanol data from all sampling events are below detection limits, and the data from the September sampling event demonstrate that methanol is not present above 2 ppm, which is consistent with anticipated conditions. Based on the small volumes and the discharge practices (as described in Section 2.0 of this request), it is anticipated that methanol would not be detected in 100-NR-2 OU groundwater.

Taking into consideration this information, RL requests that Ecology grant a contained-in determination for methanol (F003) in the groundwater at the 100-NR-2 OU. Upon approval of this request, RL will remove the "F003" listed waste code from existing waste and will not include the code in future 100-NR-2 OU waste designations.

6.0 REFERENCES

40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.

BHI-EE-01, *Environmental Investigations Procedures*, Bechtel Hanford, Inc, Richland, Washington.

DOE-RL, 1998, 100-NR-1 *Treatment Storage and Disposal Units Corrective Measures Study/Closure Plan*, DOE/RL-96-39, Rev. 0, U. S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1994, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, U. S. Environmental Protection Agency, Washington, D.C.

Resource Conservation and Recovery Act of 1976 (RCRA), 42 U.S.C. 6901, et seq.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

WAC-173-340, "Model Toxics Control Act – Cleanup," *Washington Administrative Code*, as amended.

ATTACHMENT

Strategy Presented to Ecology on August 22, 2000

Strategy for Contained in Determination of Methanol (F003) at the 100-NR-2 Operable Unit

Purpose

- Prepare a contained in determination request for methanol in the 100-NR-2 groundwater.
- The request will address the other waste codes identified on the facility Part A for the 1301-N and 1325-N cribs.
- A separate request is being prepared for methanol in soil at the 100-NR-1 Operable Unit.

Background

- Methanol was used at the 100-N laboratories and may have been disposed of in the laboratory floor drains that emptied into the cribs
- The Part A forms for the 1301-N and 1325-N identifies that approximately 6,200 pounds/ year was discharged to the cribs with the process water
- Methanol is regulated as F003 waste because of its characteristic of ignitability

Regulatory Drivers

- Washington Contained in Policy.
- The 100-NR-2 methanol carries a “state only” listed waste code (F003).
- The MTCA cleanup concentration for methanol in groundwater is 4 ppm

Approach

- Establish concentration levels below which the groundwater would not be listed waste
- Evaluate existing analytical data to assess adequacy of the data and to determine current groundwater concentrations
- Assess data against regulatory concentrations
- Prepare and submit a request to Washington State Department of Ecology for a contained in determination

Analytical Results

- Results from recent sampling events:
  - Six samples collected, in June, from the extraction wells at 100-NR-2 were all measured at below 4 ppm
  - Samples taken in support of the methanol delisting at HR-3 were below 4 ppm
- Historical data from HEIS show results where methanol concentrations in the 100-NR-2 groundwater do not exceed 4 ppm

Path Forward

- Complete data collection
- Prepare the request for a methanol contained in determination of the 100-NR-2 groundwater, following the format used in the Contained in Determination Request for hydrazine at the B-Ponds